

Answer on Question #73750, Physics / Optics

Question. What is the relation between focal length and radius of a lens?

Answer.

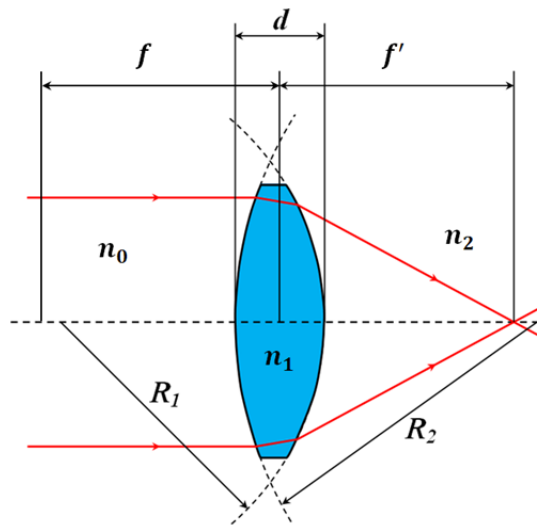
First, if we have in mind the radius of curvature, then the relation between focal length and radius of curvature of a lens

$$f = -\frac{n_0}{\Phi}; f' = \frac{n_2}{\Phi},$$

where

$$\Phi = \frac{n_1[(n_2 - n_1)R_1 + (n_1 - n_0)R_2] - (n_1 - n_0)(n_2 - n_1)d}{n_1 R_1 R_2};$$

n_0, n_1, n_2 – refractive indexes; R_1, R_2 – radii of curvature; d – the thickness of the lens.



Second, if we mean the radius of the lens itself, then the focal length does not depend on it. *Lens speed* depends on the radius of the lens.

(More detail see **Max Born & Emil Wolf Principles of Optics**)

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